

A REVIEW AND DISCUSSION ON KNOWLEDGE SHARING, INNOVATION AND BUSINESS GROUP AFFILIATION*

BİLGİ PAYLAŐIMI, YENİLİK VE İŐLETME GRUBUNA BAĐLILIK ÜZERİNE BİR İNCELEME VE TARTIŐMA

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Abstract

Firms' knowledge sharing activities include utilization of existing knowledge and creation of new knowledge with other firms. These knowledge flows refer to the exploitation and exploration of knowledge, which are defined as the different modes of organizational learning. Both types of knowledge sharing enhance existing innovations and allow for the development of new products or processes. However, explorative and exploitative knowledge sharing may have different impacts on innovation in various organizational settings. In developing economies, one of the important factors that may condition the role of knowledge sharing in innovation is the business group. Previous studies have investigated the knowledge sharing and innovation relations considering various settings and moderating factors; however, few have addressed the role of business groups. Therefore, this study discusses the effects of explorative, exploitative knowledge sharing on innovation and the role of business group affiliation in this relationship within the framework of the relevant literature. Accordingly, this study puts forward propositions which require further investigation. The propositions suggest that firms benefit from explorative and exploitative knowledge sharing in terms of innovation; however, business group affiliation might have positive or negative moderating role in this relationship.

Keywords: Knowledge Sharing, Explorative-Exploitative Knowledge, Business Groups

Öz

Firmaların bilgi paylaşım etkinlikleri diđer firmalar ile birlikte mevcut bilgiden faydalanmayı ve yeni bilginin üretimini kapsamaktadır. Örgütsel öğrenmenin farklı yöntemleri olarak belirtilen bu bilgi akıřları, bilginin sömürülmesini (exploitation) ve keřfedilmesini (exploration) ifade etmektedir. Her iki tür bilgi paylaşımı mevcut yeniliklerin iyileřtirilmesine ve yeni ürün veya süreçlerin geliřtirilmesine olanak sağlamaktadır. Bununla birlikte, çeřitli oluřumlarda, keřfedici ve sömürücü bilgi paylaşımının yenilik üzerindeki etkisi farklı olabilir. Geliřmekte olan ekonomilerde bilgi paylaşımının yenilikteki rolünü etkileyebilecek olası unsurlardan birisi de iŐletme gruplarıdır. Geçmiş alıřmalar, çeřitli oluřumları ve düzenleyici faktörleri dikkate alarak, bilgi paylaşımı ve yenilik arasındaki iliŐkiyi incelemiř olmalarına rađmen, bu alıřmaların azı iŐletme gruplarının rolüne deđinmiřtir. Bu nedenle bu alıřma, ilgili yazın çerçevesinde, keřfedici ve sömürücü bilgi paylaşımının yenilik üzerindeki etkilerini tartıřmakta ve iŐletme grubuna bađlılıđın bu iliŐkideki rolünü irdelemektedir. Bu dođrultuda, ileri arařtırma gerektiren önermeler sunmaktadır. Önermeler, yenilik yönünden firmaların keřfedici ve sömürücü bilgi paylaşımından faydalandıklarını; ancak, iŐletme grubuna bađlılıđın bu iliŐkide pozitif veya negatif düzenleyici rolü olabileceđini ileri sürmektedir.

Anahtar Kelimeler: Bilgi Paylařımı, Keřfedici-Sömürücü Bilgi, İŐletme Grupları

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1. INTRODUCTION

Knowledge sharing activities have implications for firm performance and innovativeness (Argote and Ingram, 2000; Hansen, 1999; van Wijk, Jansen and Lyles, 2008). Firms that receive more knowledge and apply it to their own operations may have advantage over others. Firms can get access to knowledge through interfirm relations. The relationships with suppliers, buyers, universities, competitors and other firms enhance firms' knowledge base and innovative capabilities (Cohen and Levintal, 1990; Faems, Van Looy and Debackere, 2005; Nonaka, 1994; von Hippel, 1988). Specifically, explorative and exploitative knowledge exchange, which can be defined as the development of new knowledge and the refinement of existing knowledge through interactions with other firms, respectively, enhance the development of new products, processes and the existing innovative outputs (Faems et al., 2005; Kim and Atuahene-Gima, 2010; Rosenkopf and Nerkar, 2001).

Knowledge sharing is a difficult process, which requires close relations between parties and the consequences of knowledge flows may be different across contexts, such as multinational firms, strategic alliances, industrial districts or business groups (Bowman and Ambrosini, 2003; Gupta and Govindarajan, 2000; Inkpen and Tsang, 2005; Mudambi and Navarra, 2004; Tallman, Jenkins, Henry and Pinch, 2004). Moreover, the impact of explorative and exploitative knowledge sharing on innovation may depend on the firms' context (Gupta, Smith and Shalley, 2006). In the literature, exploration and exploitation of knowledge in terms of innovation and performance consequences are examined in different settings, such as alliances (Rothaermel, 2001a, 2001b; Yamakawa, Yang and Lin, 2011; Yang, Lin and Peng, 2011; Yang, Zheng and Zhao, 2014), interorganizational collaborations (Faems et al., 2005; Im and Rai, 2008), joint ventures (Zhan and Chen, 2013), business groups (Lee, MacMillan and Choe, 2010), clusters (Ozer and Zhang, 2015) and independent firms (Atuahene-Gima, 2005; Chiang and Hung, 2010; Kim and Atuahene-Gima, 2010; Sidhu, Commandeur and Volberda, 2007; Su, Li, Yang and Li, 2011; Wang and Li, 2008; Wu and Shanley, 2009; Yalcinkaya, Calantone and Griffith, 2007). These studies reveal favourable and negative impacts of explorative and exploitative knowledge on innovation and performance of firms. One of these contexts that might have a conditioning (favourable or negative) impact on the relationship between these two types of knowledge sharing and innovation is the business group, which is a dominant form of organization in developing economies. Business groups consist of a collection of legally independent firms which operate under a core firm (Chang and Hong, 2000; Douma, George and Kabir, 2006). Business groups, with their strong ties among affiliates, may confer advantages to member firms by creating a setting where knowledge flows are facilitated, which might be less available to independent firms (Lamin and Dunlap, 2011). Moreover, business group affiliates may have advantages over independent firms in creating both types of knowledge with other affiliates and with firms outside their boundaries. Hence, in the present study, business group, a dominant form of organization in developing economies is considered, because the embedded relations within one may allow for various opportunities for the exploration and exploitation of knowledge (Capaldo, 2007).

This study reviews explorative, exploitative knowledge sharing and innovation relations and discusses the moderating impact of business group affiliation on this relationship. Knowledge is an important asset for firms in developing economies regarding their innovation activities. Since many firms are not able to create knowledge within their boundaries, knowledge sharing becomes important in facilitating the creation of new knowledge and utilizing the existing knowledge base. Also, knowledge sharing is one of the main features of business groups, whereby affiliates interact with each other to utilize knowledge in fostering innovation. This study is aimed at advancing the understanding of knowledge sharing, in the form of exploration, exploitation, innovation and group affiliation relations through providing a critical examination of the literature and suggesting relevant propositions. Consequently, in this study, first, the impact of explorative and exploitative knowledge sharing on innovation is explored, which followed by inquiry into the role of business group affiliation regarding these relationships. Accordingly, the expected propositions are suggested. The remainder of this paper is set out as follows. Firstly, after introducing the role of knowledge sharing in innovation, the importance of explorative and exploitative knowledge sharing in innovation is discussed. Then, the moderating role of business group affiliation in the relationship between two types of knowledge

sharing and innovation is explained. Propositions are suggested based on the knowledge sharing, innovation and business group affiliation relations in the relevant sections. Finally, the possible implications for business policy are provided in the discussion section.

2. LITERATURE

2.1. Knowledge Sharing and Innovation

Since market for resources and production factors are not developed enough in developing economies, firms benefit from sharing organizational resources, such as raw materials, production facilities, financial capital, information, experience and knowledge (Luo, 2003). Of these resources, intangible ones are the main drivers of competitive advantage (Hall, 1993). Moreover, among all intangible resources, knowledge is regarded as one of the most strategically important resources of a firm (Grant, 1996). Powell, Koput and Smith-Doerr (1996:118) emphasize the dynamic nature of knowledge and state that “*sources of innovation do not reside exclusively inside firms; instead, they are commonly found in the interstices between firms, universities, research laboratories, suppliers and customers*”. Interfirm relations provide firms with exploration and flow of knowledge from external sources such as, suppliers, buyers, customers, competitors, universities, alliance partners and government institutions (Chiang and Hung, 2010) and collaboration between firms enhance innovations (Tomlinson, 2010; Tomlinson and Fai, 2013). Firms extend their knowledge base by integrating new partners that have different and novel knowledge reservoirs (Huber, 1991). Relations with other firms enable the transfer of tacit knowledge and reduce the R&D costs (Cao, Maruping and Takeuchi, 2006; Faems et al., 2005; Wang and Libaers, 2016; Wu, 2014). Firms’ relationships in creating new products, minimize the risk associated with transaction problems and increase mutual learning, which facilitates innovation (Jean, Sinkovics and Hiebaum, 2014).

The literature generally suggests a favourable impact of knowledge sharing on innovation, firm performance and competitive advantage (Argote and Ingram, 2000; Hansen, 1999, 2002; Miller, Fern and Cardinal, 2007; Tsai, 2001; van Wijk et al., 2008). For instance, Escribano, Fosfuri and Tribo (2009) find a positive relationship between external knowledge flows from suppliers, buyers, competitors, universities, research institutions and innovation in Spanish firms. Leiponen (2005) shows a positive relationship between external knowledge sourcing from customers and competitors and the innovation performance of Finnish business service firms. Roper, Youtie, Shapira and Fernandez-Ribas (2010), comparing the U.S., U.K. and Spanish firms, argue that firm’s external knowledge sources in the form of links with suppliers and customers have a positive impact on product innovations. Leiponen (2012) finds a positive influence of knowledge breadth (external knowledge sourcing from suppliers, buyers, competitors, universities etc.) on innovative performance of Finnish manufacturing and service firms. Previous studies have focused on various categorizations of knowledge such as tacit and explicit (Hansen, 1999, 2002; Dhanaraj, Lyles, Steensma and Tihanyi, 2004), or explorative and exploitative knowledge (Chiang and Hung, 2010; Faems et al., 2005; Im and Rai, 2008; Lee et al., 2010). In this study, following March’s (1991) conceptualization, explorative and exploitative knowledge are used because both types of knowledge are closely related to innovation activities (Faems et al., 2005; Rosenkopf and Nerkar, 2001).

2.2. Explorative and Exploitative Knowledge Sharing and Innovation

The two main concepts underpinning organizational learning are termed exploration and exploitation (March, 1991). Exploration and exploitation practices refer to the different types of knowledge creation process. While exploration generates new knowledge that is different from a firm’s knowledge base, exploitation refers to the use and development of existing knowledge and the creation of incremental knowledge (Hughes, Hughes, and Morgan, 2007; Katila and Ahuja, 2002; Levinthal and March, 1993; Schulz, 2001). Interorganizational learning, which takes place between firms, includes both exploration and exploitation (Holmqvist, 2003, 2004) and is best achieved through recognizing the value of external knowledge (Lane and Lubatkin, 1998; Laursen and Salter, 2006).

That is, firms learn from knowledge transfers between partners (Holmqvist, 2004) and conduct explorative and exploitative knowledge exchanges to enhance their innovation. Im and Rai (2008:1283) define explorative knowledge sharing as the “*exchange of knowledge between firms in a long-term relationship to seek long-run rewards, focusing on the survival of the system as a whole, and pursuing risk-taking behaviours*” and exploitative knowledge sharing as the “*exchange of knowledge between firms in a long-term relationship to seek short-run rewards, focusing on the survival of the components of the system and pursuing risk-averse behaviours*”. Explorative knowledge sharing reduces market uncertainties and enhances product and process innovations. Exploitative knowledge sharing reduces coordination costs and contributes to the refinement of existing products and services (Im and Rai, 2008).

Exploration of new knowledge and exploitation of existing knowledge are at the core of innovation (Benner and Tushman, 2003; Garcia, Calantone and Levine, 2003; Jansen, Van Den Bosch and Volberda, 2006). That is, product and process innovations require exploitation of existing competencies through extension of existing knowledge and exploration of new ones through the acquisition of new knowledge and skills (Atuahene-Gima, 2005). For instance, examining the relationships between competence exploration-exploitation and innovation performance of Chinese electronics firms, Atuahene-Gima (2005) reveals that competence exploitation and exploration are positively related to incremental and radical innovation, respectively. Sidhu et al. (2007) conceptualizing exploration and exploitation in terms of nonlocal and local knowledge search, find a positive impact of high exploration orientation on innovation performance in the metal and electrical engineering industries. Kim and Atuahene-Gima (2010), defining explorative market learning as the acquisition of new knowledge and exploitative market learning as the utilization of existing knowledge, show a positive impact of these strategies on new product differentiation and new product cost efficiency in Chinese manufacturing firms.

As pointed out before, interfirm relations provide firms with explorative and exploitative knowledge, which are utilized in developing product and process innovations. In line with this view, explorative and exploitative knowledge exchanges are examined in different settings, such as alliances, buyer-supplier relations, independent firm collaborations, business groups (Faems et al., 2005; Lavie and Rosenkopf, 2006; Wu, 2014; Lee et al., 2010; Yamakawa et al., 2011) in the literature. For instance, Rothaermel (2001b) investigates how pharmaceutical and biotechnology firm alliances leverage knowledge and explore new knowledge through interfirm relations and shows that firms’ explorative and exploitative strategic alliances have a positive impact on new product development. In the context of interfirm relations, Im and Rai (2008) investigate the impact of explorative and exploitative knowledge sharing of customer and vendor firms on relationship performance in the logistics industry and reveal that while explorative knowledge sharing has a positive effect on relationship performance from a customer perspective, exploitative knowledge sharing has impact on this performance from both the customer and vendor perspectives. Chiang and Hung (2010) relate explorative and exploitative knowledge flows to open search breadth and depth, respectively, arguing that firms’ interactions with suppliers, buyers and other institutions provide them with both types of knowledge flow. The authors’ research on Taiwanese electronic product manufacturing firms reveal that search breadth and depth have a positive impact on radical and incremental innovation performance. The research, in the context of various interfirm collaborations and independent firms, generally shows a favourable influence of knowledge exchanges on the innovation performance of firms.

However, the empirical research depicts negative and curvilinear effects of explorative and exploitative knowledge on innovation as well as positive impacts. Regarding which, Kim, Park and Lee (2014) find a negative impact of explorative and exploitative knowledge acquisition on exploratory innovation output in Korean firms. Wu (2014), examining the effect of external knowledge search breadth (interactions with customers, suppliers, competitors, business groups and academic institutions) on product innovation in Chinese manufacture and service firms, depicts a a curvilinear relationship between search breadth and product innovation. Based on this evidence in the literature, it can be inferred that excessive explorative and exploitative knowledge may harm firm

innovation. In general, considering both the positive and diminishing impacts of explorative and exploitative knowledge flows through interfirm relations, it can be inferred that firms in developing economies benefit from knowledge exchanges, although excessive knowledge flows beyond a point may harm firm innovation. Based on these arguments the following propositions are suggested:

Proposition 1: *Explorative knowledge sharing has a positive effect on firm innovation.*

Similarly, with regards to exploitative knowledge,

Proposition 2: *Exploitative knowledge sharing has a positive effect on firm innovation.*

2.3. Business Group Affiliation, Explorative and Exploitative Knowledge Sharing

From an examination of exploration and exploitation in the context of intra and interfirm networks, it is suggested that these knowledge exchange strategies may have different effects on innovation in different settings (Coombs, Deeds and Ireland, 2009; Gupta et al., 2006). In particular, the context in which firms operate may have a moderating impact on the relationships between knowledge sharing and innovation (Su et al., 2011; Zhan and Chen, 2013). Several studies have examined various moderators that may interact with exploration and exploitation of knowledge, such as formal and relational governance (Yang et al., 2014), internal autonomy and organizational culture distance (Zhan and Chen, 2013), internal exploration and exploitation experience (Hoang and Rothaermel, 2010), interfunctional coordination (Atuahene-Gima, 2005), existing knowledge stock (Wu and Shanley, 2009) and organizational structure (Su et al., 2011; Zhan and Chen, 2013). These studies provide insights into how organizational mechanisms enhance or inhibit the impact of explorative and exploitative knowledge on firm performance as well as innovation. Related to this literature, in developing economies, one of the important contextual factors that may have an impact on knowledge sharing relations is the business group, which is considered as a network form of organization.

Business groups are the dominant form of organization in developing economies (Leff, 1978; Mahmood, Zhu and Zajac, 2011; Yiu, Bruton and Lu, 2005). They are defined as a collection of legally independent firms, which operate under common control with formal and informal ties among member firms (Colpan and Hikino, 2010; Cuervo-Cazurra, 2006; Granovetter, 1995; Khanna and Rivkin, 2001; Khanna and Yafeh, 2007; Leff, 1978). Business groups have emerged in response to underdeveloped institutions in developing economies so as to generate their own internal capital, labor and product markets (Chittoor, Kale and Puranam, 2015; Guillén, 2000; Khanna and Palepu, 1997, 2000a, 2000b; Leff, 1978; Yiu, Hoskisson, Bruton and Lu, 2014). Business groups can be conceived of as a network form of organization, where individual affiliates are connected with each other through both personal and equity ties (Cuervo-Cazurra, 2006; Granovetter, 1995; Mahmood et al., 2011; Vissa, Greve and Chen, 2010). Whilst member firms in a business group are legally independent, they are interdependent with each other within the group (Barbero and Puig, 2016; Chung, 2001; Yiu, Lu, Bruton and Hoskisson, 2007).

Business group affiliates benefit from knowledge exchange among themselves and spillovers within group boundaries, because the repeated use of knowledge within the group enhances the learning process of affiliates (Kim, Kim and Hoskisson, 2010; Lee, Choo and Yoon, 2016; Manikandan and Ramachandran, 2015; Wang, Yi and Yan, 2015). Knowledge sharing is easier among affiliates within the same business group than it is among unrelated firms and these transfers may not be available to other interfirm relationships (Chang, Chung and Mahmood, 2006; Lamin, 2013). In particular, groups facilitate the sharing of technological knowledge among affiliates through the internal labour market and interfirm ties, when there are no well-developed external conditions to rely on (Chang et al., 2006; Chang and Hong, 2002; Lee et al., 2016). Firm ties among members increase trust, which leads to the transfer of knowledge, something that is difficult to acquire through market interactions (Hsieh, Yeh and Chen, 2010). Moreover, knowledge spillovers from the research of other firms in a group can make affiliate firms more innovative than independent ones. In fact, internal labour and technology markets have an important role in facilitating knowledge sharing among

affiliates and learning from each other through such knowledge flows facilitates innovation (Belenzon and Berkovitz, 2010; Guzzini and Iacobucci, 2014; Hsieh et al., 2010).

In addition to knowledge exchanges in interfirm relations, in business groups, explorative and exploitative knowledge sharing can be conducted both internally with other affiliates and externally with firms outside the group for innovation (Rothaermel and Alexandre, 2009). Hence, affiliates' internal and external embeddedness may have a conditioning (favourable or negative) impact on the relationship between knowledge sharing and innovation. Business group affiliates share existing technologies in order to exploit those available more extensively within the group. New technologies, on the other hand, provide new knowledge for differentiating products. Also, groups' internal markets provide exploration of knowledge (Skold and Karlsson, 2012). Group affiliates also share explorative knowledge in order to integrate new technological knowledge that is different from their existing knowledge base. Regarding which, Korean business groups share explorative and exploitative knowledge among affiliates and disseminate this knowledge to overseas subsidiaries (Lee et al., 2010). Therefore,

Proposition 3a: *Business group affiliation positively moderates the relationship between explorative knowledge sharing and innovation.*

On the other hand, the ties that link member firms may create embeddedness of affiliated firms (Vissa et al., 2010), which “refers to the fact that economic action and outcomes are affected by the structure of the overall network of relations” (Granovetter, 1992:33). Firms affiliated with business groups are embedded in their internal and external relations and this embeddedness may have two different effects regarding their social and economic settings. That is, group firms benefit from the embedded ties that affiliates have with other firms internally and outside the group, externally, through accessing knowledge and resources (Becker-Ritterspach and Bruche, 2012; Chen and Jaw, 2014). However, this embeddedness may be harmful since continuous relations may not create new resources for innovation (Chung, 2004; Tomlinson and Fai 2016; Uzzi, 1996, 1997). The embedded relations within the group may not provide affiliates with novel knowledge for product and process innovations (Chittoor, Sarkar, Ray and Aulakh, 2009). Network relations among affiliates facilitate the exchange of exploitative knowledge; however, exploitative knowledge flows among themselves or with firms outside the group may hinder the creation of explorative knowledge (Hughes et al., 2007; Phene, Tallman and Almeida, 2012). Whilst strong relations among affiliated firms facilitate knowledge exploitation, these ties may inhibit the exploration of new knowledge (Lee et al., 2010; Wright, Filatotchev, Hoskisson and Peng, 2005). Consequently, firms may not develop new capabilities from existing knowledge if they cannot appreciate that their own capabilities are no longer effective (Lane and Lubatkin, 1998). Hence, the counter proposition can be formulated as:

Proposition 3b: *Business group affiliation negatively moderates the relationship between explorative knowledge sharing and innovation.*

Firms' networks can provide them with new knowledge and also the ability to understand how to combine this with existing knowledge (Singh, Kryscynski and Gopal, 2016). Integrating knowledge to generate new knowledge from different parts of the organization is an exploitative process. (Schulz, 2001). Affiliates achieve learning through exchanging technological knowledge with other affiliates so as to deliver incremental innovation. Also, sharing exploitative knowledge in the buyer-supplier relationships allows them to utilize existing knowledge and to develop complementary technologies (Lee et al., 2010). In addition, business group firms produce technology for a specific firm within the group, which can be shared within the group and this technology sharing is a form of exchange of knowledge that contributes to product development (Skold and Karlsson, 2012). However, while the dense relations among members of a business group may prevent firms from conducting explorative activities, cooperation between them can facilitate their exploitative activities, which will enhance their existing knowledge resources (Jansen et al., 2006). Thus,

Proposition 4a: *Business group affiliation positively moderates the relationship between exploitative knowledge sharing and innovation.*

If group firms rely only on knowledge exploitation within the group, they may confront increasing similarity of knowledge within the group (Gobbo and Olsson, 2010; Granovetter, 1992; Lavie and Rosenkopf, 2006). A high level of embeddedness may cause firms to share less as the knowledge they share becomes similar (Cowan, Jonard and Zimmermann, 2007). That is, social relations among affiliated firms may create an overembedded setting in which economic behaviour becomes inefficient (Chung, 2004). Regarding, long standing group firms' embeddedness constrains affiliates' external search (Gubbi, Aulakh and Ray, 2015). Independent firms may be more effective in exploiting knowledge from other firms thanks to their low embeddedness in such environments (Chittoor et al., 2009). Group firms' closed network may be beneficial in terms of integration of similar knowledge; however, this knowledge may not lead to increased innovation performance (Mors, 2010). Ongoing relations may also inhibit innovation by creating resource redundancy owing to the use of existing knowledge (Mahmood, Chung and Mitchell, 2013). A firm's old internal knowledge may be more reliable and established than new knowledge in creating innovation; however, if a firm uses the former knowledge, it cannot experience new knowledge, which may be the source of new product innovations (Katila, 2002). When exploitative knowledge exchanges become embedded within a group, firms can integrate knowledge effectively; however, this knowledge base may become obsolete and exploration of new knowledge may become costly (McNamara and Baden-Fuller, 1999). Firms affiliated with groups may focus on local search within the group from other affiliates instead of acquiring new knowledge from outside firms (Mahmood et al., 2013), which will not create new opportunities for new innovations. Regarding which, Gubbi et al. (2015) show that Indian group firms are less likely to undertake international search than independent ones after industry specific institutional changes. The argument is that institutional changes may constraint the groups' ability to adapt to changes and the inertial impact of affiliation may limit search behaviour. Business group firms that pursue their own strategies may be more 'insulated' from competition in the capital, labour and product markets than independent ones. On the other hand, independent firms may pursue a more market oriented approach when searching for resources (Kim et al., 2010). As a result, sharing existing exploitative knowledge may not benefit an affiliated firm in terms of new product or process developments. Hence, the counter proposition can be stated as:

Proposition 4b: *Business group affiliation negatively moderates the relationship between exploitative knowledge sharing and innovation.*

3. DISCUSSION

The purpose of this paper has been to discuss the impact of knowledge sharing, particularly explorative and exploitative knowledge, on innovation and whether this relationship is contingent on organizational context, namely, business group affiliation. Following previous literature and considering the context dependent impact of knowledge sharing, initially, a positive impact of explorative and exploitative knowledge sharing on innovation was proposed and then it was argued that business group affiliation may moderate this relationship in favour of affiliated firms. In addition, a possible negative moderation impact of affiliation was considered (Gupta et al., 2006; Inkpen and Tsang, 2005). The previous research has revealed favourable and negative effects of explorative and exploitative knowledge sharing on innovation in various settings; however, the impact of business groups has been examined to a lesser extent (Atuahene-Gima, 2005; Hoang and Rothaermel, 2010; Su et al., 2011; Yang et al., 2014; Zhan and Chen, 2013). Hence, this study extends the previous research by proposing that the creation of knowledge through exchanges with partners and its application to innovation activities are essential in an developing economy context, because knowledge is a scarce resource and that both explorative and exploitative knowledge exchanges between firms lead to increased innovation performance (Su et al., 2011; Zhan and Chen, 2013). Moreover, since knowledge sharing impact could be context dependent, future research should take group affiliation into consideration.

The arguments presented in this paper have some implications for business strategy and policy in terms of knowledge sharing and innovation relations in all firms in developing economies and in the

particular context of business groups. Firstly, interfirm interactions with partners to exchange knowledge contribute to innovation performance. Since knowledge is a scarce resource for developing economy firms, creation and application of knowledge in innovation activities requires exchange relations as well as its production within firms. Specifically, explorative and exploitative knowledge exchanges, which represent the creation of new and utilization of existing knowledge with other firms, respectively, have an important role to play in product and process innovations. Consequently, managers should be aware that both types of interfirm knowledge flows are necessary for new product and process developments or improving existing innovations. Secondly, in this study, possible moderation impact of affiliation on the relationship between knowledge sharing and innovation is discussed. Being affiliated with a group may have both benefits and harms in terms of knowledge sharing and innovation relations. Group firms take advantage of their internal capital markets, which provide resources and knowledge for innovation; however, since independent firms lack access to these group advantages, they may need to be more effective in their knowledge exchange relationships with other firms in order to innovate. Owing to their group and reputational advantages, such as government privileges, financial capital, internal markets and research facilities (Chang et al., 2006), affiliated firms may have more knowledge exploration opportunities with other firms, especially with foreign firms. On the other hand, managers should be aware that in a networked and embedded setting, affiliates may not be able to create novel knowledge or utilize the existing knowledge effectively. In order to overcome the possible negative impacts of inertial disadvantages, group firms should effectively manage their knowledge relations within and outside their network for innovation activities. To conclude, this paper discusses the relations between knowledge sharing, innovation and business group affiliation and suggests propositions which can be further investigated through an empirical research. A further examination can help uncover whether firms benefit from explorative and exploitative knowledge sharing and groups create a value for their member firms.

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